

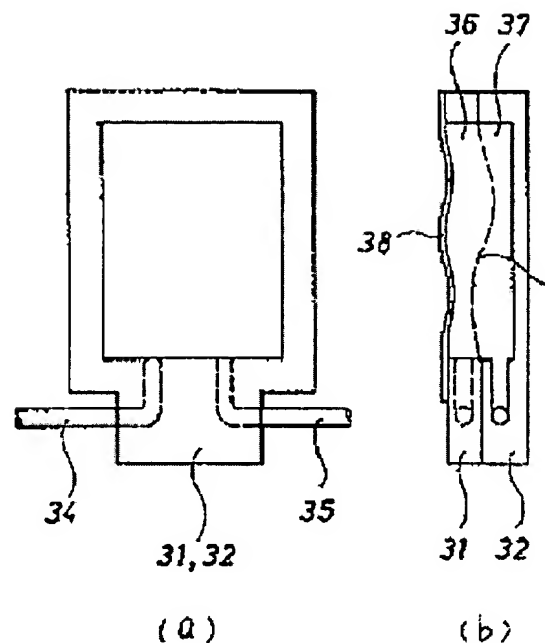
**INK JET TYPE SERIAL PRINTER**

**Patent number:** JP5201015  
**Publication date:** 1993-08-10  
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- european:  
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**Abstract of JP5201015**

**PURPOSE:** To improve delivery characteristics of ink by reducing dynamic pressure of ink against the nozzle surface during the reciprocating movement of a head as far as possible.

**CONSTITUTION:** A damper member comprises two bodies 31, 32 and a filter 33 is disposed between the two bodies 31, 32. Cavities 36, 37 are formed on either side of the filter 33 respectively and a flexible film 38 is fused to the side of the cavity 36.



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CLAIMS

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[Claim(s)]

[Claim 1] Carriage which carries out a both-way drive to the recording paper The ink-jet head carried on this carriage It is the ink-jet formula serial printer equipped with the above, and is characterized by preparing the cavity which becomes considering the flexible film for pressure fluctuation absorption as one wall surface, and the filter which countered with the aforementioned flexible film and was arranged in the middle of the ink supply pipe for supplying ink to the aforementioned ink-jet head from an ink tank.

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[Translation done.]

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] this invention relates to the serial printer which carried the on-demand type ink-jet head.

[0002]

[Description of the Prior Art] Drawing 1 is the schematic diagram of a common ink-jet formula serial printer, an ink-jet head is carried in carriage 2, carriage 2 counters a platen 3 and a both-way drive is carried out in accordance with the guide shafts 4 and 5. The signal input line 6 made from the flexible printed circuit board (FPC) for giving a driving signal and the ink tube 7 for supplying the ink from the ink tank 8 to a head 1 are formed in the head 1. a natural thing \*\*\*\*\* -- a head 1 -- the opposite section of the platen 3 -- a nozzle -- a hole prepares -- having -- this nozzle -- predetermined record is performed on the recording paper with which injected ink from the hole and the platen was equipped

[0003]

[Problem(s) to be Solved by the Invention] It is to become a problem here to give excessive acceleration to a head 1, when a direction changes in recording while the both-way drive of the head 1 is carried out in accordance with the guide shafts 4 and 5, and to also give acceleration then to the ink in the ink tube 7, and for this have delicate influence to a head 1. for example, when a head 1 drives from the right to the left by drawing 1 and it stops at the left end, the ink in the ink tube 7 is pressurized by the nozzle pore of a head 1 -- having -- a nozzle -- the time of ink flowing out of a hole, driving from the left to the right conversely, and stopping at the right end -- the ink in the ink tube 7 -- a nozzle pore -- negative pressure -- becoming -- a nozzle -- air will be inhaled from a hole \*\* the outflow of unnecessary ink pollutes a printer -- a nozzle -- the suction of the air from a hole is connected with the injection impotentia of an ink drop, and brings about the fall of the reliability of a printer anyway The influence serves as size, so that, as for such a situation, printing speed becomes a high-class high speed printer by the low printer although there is little influence (since acceleration becomes small).

[0004] Although the device (JP,59-70576,A) which winds near the head the method and ink tube which carry an ink tank on carriage spral, and weakens the influence of acceleration, the method of making acceleration of carriage loose further, etc. are taken as a method of avoiding this If an ink tank is carried on carriage, the load for the drive of carriage will become large for an ink tank, or If a big ink tank is moved, a space will be required so much, and a printer is enlarged, and As for the conventional cure, it was imperfect that the method with the perfect method of winding an ink tube not becoming, and making acceleration of carriage loose would also reduce the printing speed of a printer so much, and it became a depression etc.

[0005] The purpose of this invention offers the ink-jet formula serial printer which has arranged the simple damper for weakening the movement of ink in a head block in order to solve an above-mentioned trouble.

[0006]

[Means for Solving the Problem] The ink-jet formula serial printer of this invention is characterized by

to prepare the cavity which becomes considering the flexible film for pressure fluctuation absorption as one wall surface, and the filter which countered with the aforementioned flexible film and was arranged to the recording paper in the middle of the ink supply pipe for supplying ink to the aforementioned ink-jet head from an ink tank in the ink-jet formula serial printer equipped with the carriage which carries out a both-way drive, and the ink-jet head carried on this carriage.

[0007]

[Example] Drawing 2 is the development of an ink-jet head block used as one example of this invention. the bending produced in a piezo-electric element 11 when 10 gives voltage to a piezo-electric element 11 with an on-demand type ink-jet head object -- using -- a nozzle -- it is the head known from the former which injects ink from a hole, and in order to high-accumulate a nozzle here, the piezo-electric element 11 is arranged at both sides of the head object 10 naturally -- the number of piezo-electric elements -- a nozzle -- the hole is prepared and it can consider as the high accumulation multi-nozzle head which has 24-32 nozzles on one head object 10 by making it such a configuration 12 takes the electrical connection of a piezo-electric element 11 and the copper foil section of FPC13 by the electrical conductive gum. If certain [ in electrical connection ] by pressing FPC13 to a head object, 14 has the operation to close, while being fabricated with material with elasticity, such as backing and rubber, and preventing permeation of the ink to a piezo-electric element 11 and an electric lines or cable with FPC13. 15 was made from the heater substrate with the stainless steel board, and has pasted up the heater 16 and the thermistor 17 for temperature detection on this heater substrate 15. Since such a heater can always inject a fixed ink drop while ink prevents that the viscosity goes up at low temperature and always carries out ink injection efficiently as a head object 10 with fixed viscosity, it has the effect that printing which the quality of printed character always fixed can be performed. Although it was possible to have used heater raw materials arbitrary as a heater 16, it has low electric resistance below at the temperature with the Curie point to a certain temperature called posistor (Murata Manufacturing, trademark) here, and the self-temperature-control element which has high electric resistance was used above the temperature.

[0008] However, the thermistor 17 is performing the temperature control from the point of the safety of not going up more than the temperature of Curie point + $\alpha$  even if this is wrong. This is because head temperature can be quickly raised under the degree of low temperature by using an element with the Curie point quite higher than the temperature of choice.

[0009] 18 [ next, ] -- the 1st ink tube -- the end -- the head object 10 -- the other end -- a damper -- it is connected with the end of a member 19 a damper -- as for the other end of a member 19, the end of the 2nd ink tube 20 is connected, and the other end is connected with an ink tube from an ink tank a damper -- although the structure of a member 19 is explained in full detail -- the ink from an ink tank -- the damper from the 2nd ink tube 20 -- a member 19 -- pass the 1st ink tube 18 further -- although the head object 10 is supplied -- this damper -- the role of a member 19 restricts sharply the acceleration and deceleration given to the ink in the ink tube which receives at the time of the rapid acceleration and deceleration of the carriage mentioned above

[0010] 21 and 22 -- the head electrode holder of a couple -- a ten or less head object damper -- even a member 19 and the 2nd ink tube 20 include in one While 23 being nose-of-cam BAKKIN of an elastic body, and equipping at the nose of cam of the head object 10, being pressed by the nose-of-cam presser foot 24 and preventing permeation of the head electrode holder 21 and the ink into 22 By making a suction cap engage with the front face of this nose-of-cam presser foot 24 in making a suction cap engage with a head nozzle side, and filling up with ink like the Japanese-Patent-Application-No. No. 141297 [ 57 to ] publication which applied previously Airtightness is raised more and it has the effect that restoration of ink, a purge, etc. can be performed efficiently.

[0011] Next, 9 is a mask for protecting the nozzle side of a head, and is attached in both sides of the head electrode holders 21 and 22 after equipping the head electrode holders 21 and 22 with the nose-of-cam presser foot 23. The side elevation in the state where this mask 9 was attached is shown in drawing 7 (a), and a plan is shown in (b).

[0012] As for the cap a, it is set as about 0.1-0.4mm in the feature that the apical surface 102 of a mask 9

is parallel mostly with the nozzle side 101 of the head object 10 as shown in this drawing, and the mask apical surface 102 has moreover projected from the nozzle side 101. By the printer mechanism, the nozzle side 101 and an apical surface 102 are fields which counter a platen, and counter with the recording paper during printing. Although it is an ideal to always have stuck the recording paper wound around the platen to the platen, when recording by the roll sheet for a long time, full adhesion is impossible, the float of a small amount is not avoided, and, in the case of continuation paper with a perforation, the float in a perforation is not avoided by any means. The duty of this mask 9 protects the nozzle side 101 to the float of such the recording paper. namely, -- if this contacts the nozzle side 101 when the recording paper floats -- the nozzle of a nozzle side -- it has delicate influence on a hole a nozzle -- permeation of the foam to a hole, and a nozzle -- these are connected with degradation of printing, and printing impotentia in adhesion of paper powder in a hole etc. However, with the composition of this example, since the apical surface 102 of a mask 9 carries out point \*\*\*\*\* to the float of paper, the contact to the nozzle side 101 is avoidable. Therefore, it has the advantage which troubles, such as permeation of a foam and adhesion of paper powder, are avoided, and can aim at improvement in reliability with the recording paper. In addition, since this mask 9 needs to manage the cap a with the nozzle side 101, it loosens a screw 91, rotates a mask 9 like an arrow 93 centering on a pin 92, adjusts a gap a, and is attached by the method of bolting a screw 91 and fixing.

[0013] Next, the damper member which omitted detailed explanation by \*\*\*\* is described. the damper which used drawing 3 by drawing 2 -- the development showing one example of a member 19 -- it is -- this damper -- while a member 19 is fabricated by the 1st ink tube 18, the 2nd ink tube 20, and one with injection molding of polyethylene and the cavity 25 is formed, the branch pipe 26 to this cavity 25 is formed in the ink pipe-connection section of the 1st ink tube 18 and the 2nd ink tube 20 the polyethylene film which 27 covers this cavity 25 and serves as the one wall surface -- a damper -- it is welded to a member 19

[0014] 28 is the salient in a cavity 25 and prevents past [ bending ] into the cavity 25 of the polyethylene film 27.

[0015] drawing 4 -- this damper -- it is the cross section of a member 19 and the polyethylene film serves as a flexible wall surface of a cavity 25 the ink from an ink tank -- this damper -- when a head object is supplied through a member 19, ink enters also into a cavity through a branch pipe Since the air in a cavity 25 decreases when it draws in from a nozzle side and is filled up with ink, this interior is considerably filled with ink. anyway -- the case where acceleration joins the ink in an ink tube -- this damper -- the rapid acceleration is absorbed by \*\*\*\*\* in the cavity 25 of a member 19 When \*\*\*\*\* is lost in a cavity 25, absorption at the time of acceleration should be performed on the flexible wall surface by the polyethylene film 27.

[0016] moreover, such a damper -- since it equipped with the member 19 in the head electrode holder, it was able to consider as the impact-absorption equipment which can respond to sudden acceleration of the carriage which could short-\*\*\*\* the 1st ink tube 18 very much, and described it previously enough Moreover, since injection molding was carried out to the 1st and the 2nd ink tube by one by the product made from polyethylene, that the connection place of a tube is made few was also able to give flexibility to the tube.

[0017] next, drawing 5 -- a damper -- other examples of a member are shown This damper member is what connected the thing 29 of the saccate of a flexible film with T typeface branching tube 30, and the film bag 29 will be understood by explanation of the above-mentioned [ functioning as a damper which consisted of whole surface flexible walls ].

[0018] drawing 6 -- a damper -- what shows other examples of a member -- it is -- a filter internal-organs type damper -- it is a member two damper members consist of 31 and 32 -- having -- this damper of two bodies -- while being equipped with a filter 33 among members 31 and 32, two cavities 36 and 37 are constituted bordering on this filter 33, the flexible film 38 is welded and the above-mentioned serves as a flexible wall surface the same The 1st damper, as shown in drawing, since it is a member 32 and one the 2nd damper, the ink from an ink tank goes into the 2nd cavity 37 from the 2nd ink tube 35, and, as for the 1st ink tube 34, a filter 33 is further supplied [ at the 1st ink tube 34 ] by the member 31 from

\*\*\*\*\* 1 cavity 36 to a head object, as for the 2nd ink tube 35. Thus, since a filter 33 is always passed when ink flows the inside of a damper, it has the effect which can supply the pure ink removed in the dust of ink inside and outside etc. to a head.

[0019]

[Effect of the Invention] According to the above-mentioned composition of this invention, since the flexible film and the filter were arranged face to face and a flow of the liquid in the cavity which can absorb the pressure fluctuation by reciprocation of carriage with a flexible film, and is constituted between a flexible film and the filter which counters decreases, it is effective in the absorption to higher pressure fluctuation being attained.

[0020] Furthermore, since it is not necessary to prepare a filter into an ink supply pipe, it can miniaturize.

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[Translation done.]

【0018】図6はダンパー部材の他の実施例を示すもので、フィルター内蔵型ダンパー部材である。ダンパー部材は2体31、32で構成され、この2体のダンパー部材31、32の間にフィルター33が装着されるとともにこのフィルター33を境に2つのキャビティ36、37が構成され、前述同様、可撓性フィルム38が融着され可撓壁面となる。図の如く、第1インクチューブ34は第1ダンパー部材31に、第2インクチューブ35は第2ダンパー部材32と一体であるのでインクタンクからのインクは第2インクチューブ35から第2キャビティ37に入りフィルター33を径て第1キャビティ36から第1インクチューブ34へ、更にヘッド体へ供給される。このようにダンパー内をインクが流れるとき常にフィルター33を通過するのでインク内外のゴミ等を除去された清浄なインクをヘッドへ供給できる効果を有する。

【0019】

【発明の効果】本発明の上記構成によれば、可撓性フィルムとフィルタを対向して配設したので、キャリッジの往復動による圧力変動を可撓性フィルムで吸収でき、また、可撓性フィルムと対向するフィルタとの間で、構成されるキャビティ内の液体の流動が少なくなるため、より高い圧力変動に対する吸収が可能になるという効果がある。

【0020】さらに、フィルタをインク供給管中に設ける必要がないので小型化できる。

\*【図面の簡単な説明】

【図1】 従来のインクジェット式シリアルプリンターの概要を示す図。

【図2】 本発明の1実施例を示すヘッドブロックの展開図。

【図3】 本発明の1実施例となるダンパー部材の展開図。

【図4】 ダンパー部材の断面図。

【図5】 ダンパー部材の第2実施例を示す図。

【図6】 ダンパー部材の第3実施例を示す図。

【図7】 マスクの取付け状態を示す図。

【符号の説明】

9 マスク

10 ヘッド体

11 ピエゾ素子

12 導電ゴム

13 FPC

14 バックキン

15 ヒーター基板

16 ヒーター

17 サーミスタ

19 ダンパー部材

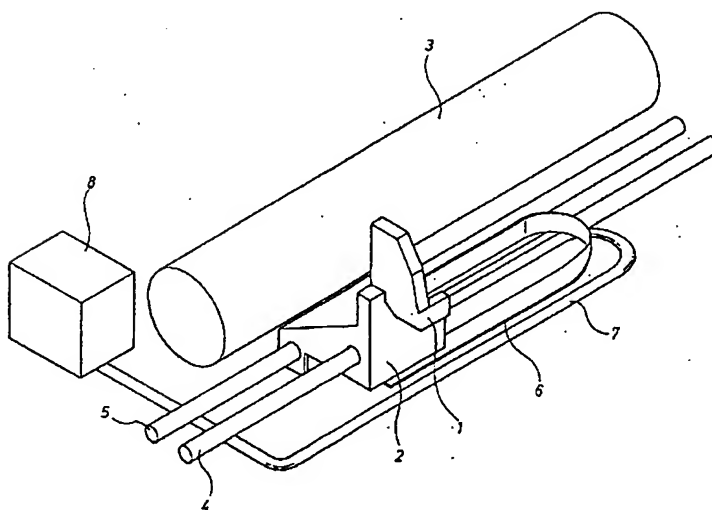
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22 ヘッドホルダー

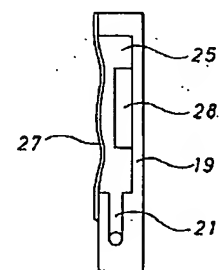
23 先端バックキン

24 先端押え

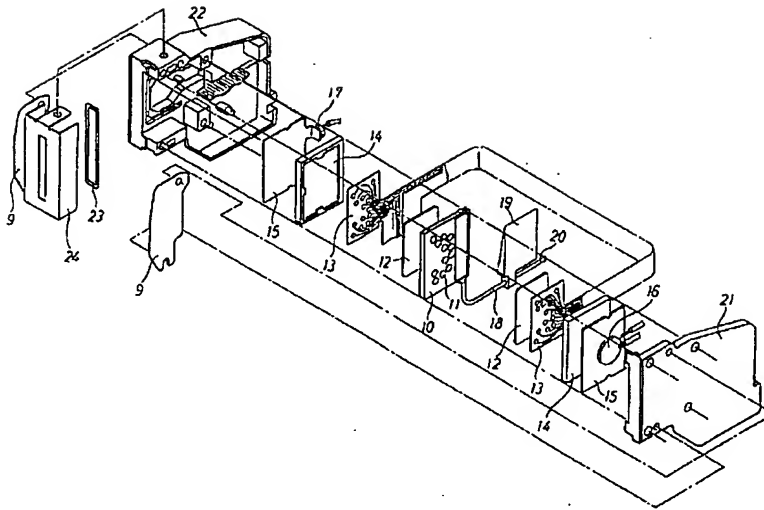
【図1】



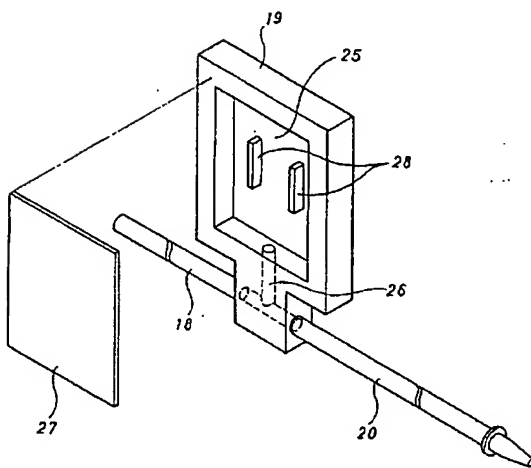
【図4】



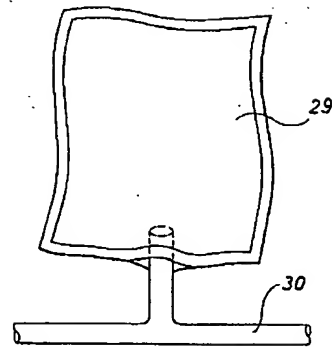
【図2】



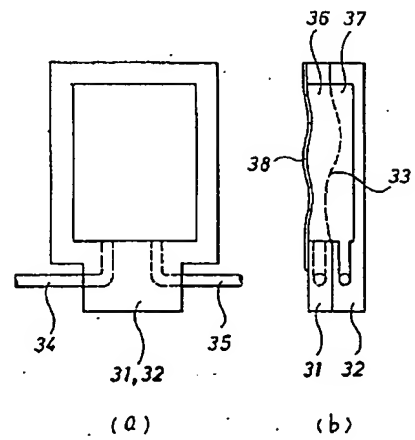
【図3】



【図5】

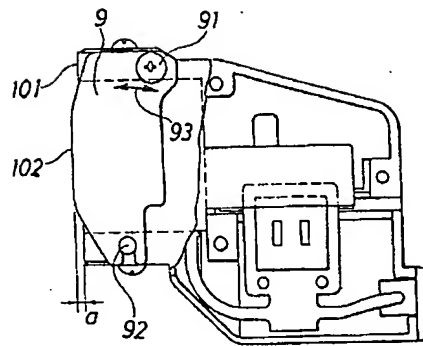


【図6】

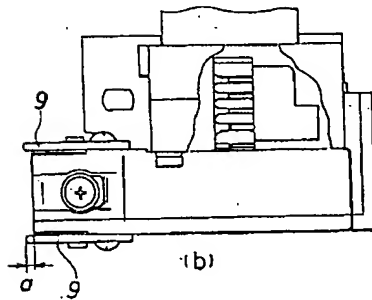




【図7】



(a)



(b)